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DRAWINGS ATTACHED

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(54) SURGICAL DILATOR

(71) We, NATIONAL RESEARCH DEVELOPMENT CORPORATION, a British Corporation established by Statute, of P.O. Box 236, Kingsgate House, 66—74, Victoria Street, London, S.W.1, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to surgical dilators and in particular to an oesophageal dilator.

According to the invention, there is provided a surgical dilator comprising a hollow tubular member, the wall of which is provided by a tubular metal core of lattice form and a continuous layer of a resilient material, the elements making up the lattice defining diamond shapes in the unstressed condition of the dilator, the major diagonal dimension of each of which shape being in the direction of the longitudinal axis of the wall and the included acute angle of each shape in the unstressed condition of the dilator being between 45° and 60°, the dilator being such that when the dilator is subjected to an axial tensile force, the wall will be caused to contract diametrically and extend axially and will return substantially to its normal shape of its own accord when the force is removed.

Features and advantages of the invention will be apparent from the following description of embodiments thereof given by way of example only in conjunction with the accompanying drawings in which:—

Figures 1 to 3 show diagrammatically different embodiments of dilator, the resilient layer in which the dilator core is embedded being deleted for the sake of clarity; Figures 2 and 3 being partial views of the core;

Figure 4 is a transverse cross-section of the dilator of Figure 1, with the addition of spikes;

Figure 5 shows diagrammatically a pair of tensioning forceps for inserting the dilator into an oesophagus in conjunction with an oesophagascope;

Figure 6 shows diagrammatically an instrument for inserting the dilator into an oesophagus, and

Figure 7 shows in cross-section a sleeve covering a dilator according to the invention.

Referring to Figure 1, the dilator comprises a hollow tubular member the wall of which is defined by a tubular core 1 of lattice form embedded in a continuous tubular layer 3 (Figure 4) of a resilient material such as rubber. The elements 2 making up the lattice are of metal, for example, stainless steel wire, and define diamond shapes the major diagonal dimension of which being in the direction of the longitudinal axis of the dilator wall. The included acute angle α of each diamond formed by the elements in the unstressed condition of the dilator is between 45° and 60° since this range gives the desired low values for the ratio of axial extension-to-change in diameter of the dilator. Low values for this ratio are required when the dilator is to be used in an oesophagus since only small axial extensions of the dilator can be tolerated. The elements may be woven or plaited.

To enable the dilator A to be inserted in, for example, the oesophagus, loops 4 (Figure 5) are formed at each end of the core 1 to enable, as will be apparent later in the description, a tensioning instrument to apply an axial tension force to the dilator to contract it diametrically and to extend it axially; these loops are rubber coated and may be provided by the ends of the core 1 or may be separate loop members secured to the core. Care must be taken to ensure that the loops have no tendency to bend inwardly of the core where they will foul the lumen of the dilator.

The tensile strength and diameter of the wire, the number of wires used and size of the weave together with the resilience of the layer will determine the physical characteristics of the dilator. By selecting these factors a variety of useful dilators can be produced of different sizes, varying in length and diameter.

The ends of the metal wire of the core

[Price 5s. 0d. (25p)]